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EOSDIS Maintenance and Development Project

**Release 7
Systems Management Subsystem
Database Design and Schema
Specifications for the EMD Project**

July 2004

**Raytheon Company
Upper Marlboro, Maryland**

Release 7 Systems Management Subsystem Database Design and Schema Specifications for the EMD Project

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Preface

This document is a formal contract deliverable. It requires Government review and approval within 45 business days. Changes to this document will be made by document change notice (DCN) or by complete revision.

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This document describes the data design and database specification for the System Management subsystem. It is one of thirteen documents comprising the detailed database design and database schema specifications for the as-delivered ECS Subsystems. A complete list of the ten documents follows:

- | | |
|-------------|--|
| 311-EMD-001 | Release 7 Data Management (DM) Subsystem Database Design and Database Schema Specifications for the EMD Project |
| 311-EMD-002 | Release 7 Ingest Subsystem Database Design and Database Schema Specifications for the EMD Project |
| 311-EMD-003 | Release 7 Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specifications for the EMD Project |
| 311-EMD-004 | Release 7 Science Data Server (SDSRV) Subsystem Database Design and Database Schema Specifications for the EMD Project |
| 311-EMD-005 | Release 7 Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications for the EMD Project |
| 311-EMD-006 | Release 7 Subscription Server (SUBSRV) Subsystem Database Design and Database Schema Specifications for the EMD Project |

311-EMD-007	Release 7 Management Support Subsystem (MSS) Database Design and Database Schema Specifications for the EMD Project
311-EMD-008	Release 7 Configuration Registry Subsystem (CONFIG) Database Design and Database Schema Specifications for the EMD Project
311-EMD-009	Release 7 PDS Subsystem Database Design and Database Schema Specifications for the EMD Project.
311-EMD-010	Release 7 Name Server Subsystem Database Design and Database Schema Specifications for the EMD Project
311-EMD-011	Release 7 Order Manager Server Database Design and Database Schema Specifications for the EMD Project
311-EMD-012	Release 7 Spatial Subscription Server (SSS) Database Design and Database Schema Specifications for the EMD Project
311-EMD-013	Release 7 Data Pool Database Design and Database Schema Specifications for the EMD Project

Entity Relationship Diagrams (ERDs) presented in this document have been exported directly from tools and some cases contain too much detail to be easily readable within hard copy page constraints. The reader is encouraged to view these drawings on-line using the Portable Document Format (PDF) electronic copy available via the ECS Data Handling System (ECS) on the world wide web at <http://edhs1.gsfc.nasa.gov>.

Abstract

This document outlines “as-built” database design and database schema of the Systems Management Subsystem database including the physical layout of the database and initial installation parameters.

Keywords: data, database, design, configuration, database installation, scripts, security, data model, data dictionary, replication, performance tuning, SQL server, database security, replication, database scripts

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Appendix A. MSS ERDs

1. Introduction

1.1 Identification

This Systems Management Subsystem (MSS) Accountability Database Design and Database Schema Specification document, is part of Contract Data Requirements List (CDRL) Item Number 23, which is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Maintenance and Development (EMD) Contract (NAS5-03098).

1.2 Scope

The MSS Accountability Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 7 MSS software.

1.3 Purpose

The purpose of the MSS Accountability Database Design and Database Schema Specification document is to support the maintenance of MSS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

1.4 Audience

This document is intended to be used by ECS maintenance and operations staff. The document is organized as follows:

Section 1 provides information regarding the identification, scope, purpose and audience of this document.

Section 2 provides a listing of the related documents, which were used as a source of information for this document.

Section 3 contains the MSS physical data model which is the database tables, triggers, stored procedures, and flat files usage.

Section 4 provides a description of database performance and tuning features such as indexes, caches, and segments.

Section 5 provides a description of the database security infrastructure used, the approach and a list of the users, login/group, and object permissions available upon initial installation.

Section 6 provides a description of database and database related scripts used for installation, de-installation, backup/recovery, and other miscellaneous functions.

Section 7 contains replication design, implementation details, and database/server configuration.

2. Related Documents

2.1 Applicable Documents

The following documents, including Internet links, are referenced in this document, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this volume.

305-EMD-001	Release 7 Segment Design Specification for the ECS Project
920-TDG-009	DAAC Hardware Database Mapping/GSFC
920-TDN-009	DAAC Hardware Database Mapping/NSIDC
920-TDE-009	DAAC Hardware Database Mapping/EDC
920-TDL-009	DAAC Hardware Database Mapping/LARC
920-TDS-009	DAAC Hardware Database Mapping/SMC
920-TDG-010	DAAC Database Configuration/GSFC
920-TDN-010	DAAC Database Configuration/NSIDC
920-TDE-010	DAAC Database Configuration/EDC
920-TDL-010	DAAC Database Configuration/LARC
920-TDS-010	DAAC Database Configuration/SMC
920-TDG-011	DAAC Sybase Log Mapping/GSFC
920-TDN-011	DAAC Sybase Log Mapping/NSIDC
920-TDE-011	DAAC Sybase Log Mapping/EDC
920-TDL-011	DAAC Sybase Log Mapping/LARC
920-TDS-011	DAAC Sybase Log Mapping/SMC
922-TDG-013	Disk Partitions/GSFC
922-TDN-013	Disk Partitions/NSIDC
922-TDE-013	Disk Partitions/EDC
922-TDL-013	Disk Partitions/LARC
922-TDS-013	Disk Partitions/SMC

These documents are maintained as part of the EMD baseline and available on the world wide web at the URL: <http://cmdm.east.hitc.com/baseline>. Please note that this is a partial mirror site in that some items are not available (they are identified) since this is open to all. This site may also be reached through the EDHS homepage. Scroll page to the connections line and click on the EMD Baseline Information System link.

2.2 Information Documents

The following documents, although not directly applicable, amplify or clarify the information presented in this document. These documents are not binding on this document.

313-EMD-001	Release 7 CSMS/SDPS Internal ICD for the ECS Project
609-EMD-001	Release 7 Operations Tools Manual for the ECS Project
611-EMD-001	Release 7 Mission Operation Procedures for the ECS Project

3. Data Design

3.1 Database Overview

The MSS database implements the large majority of the persistent data requirements for the MSS Accountability Management Service CSC. The database is designed in such a manner as to satisfy business policy while maintaining data integrity and consistency. Database tables are implemented using the Sybase Relational Database Management System (DBMS). All components of the MSS database are described in the sections, which follow, in sufficient detail to support maintenance needs.

3.1.1 Physical Data Model Entity Relationship Diagram

The Entity Relationship Diagram (ERD) presents a schematic depiction of the MSS physical data model. The ERDs presented here for the MSS database were produced using the Power DesigNor Data Architect Computer Aided Software Engineering (CASE) tool. ERDs represent the relationship between entities or database tables. On ERDs, tables are represented by rectangles and relationships are represented as arrows (see Figure 3-1).

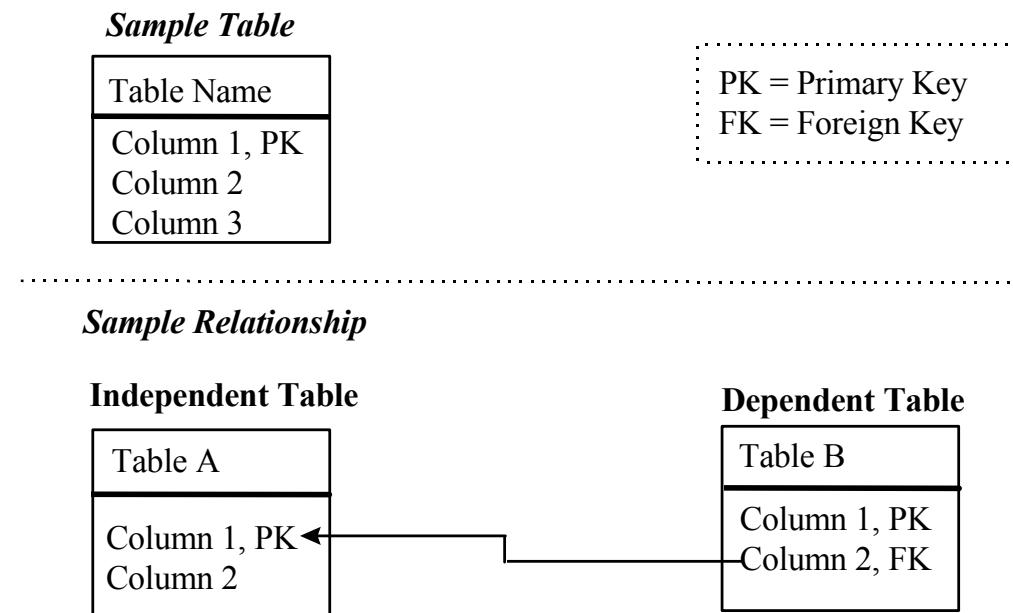


Table A has a one to many relationship with Table B

Figure 3-1. Sample ERD

The ERDs for the MSS database are found in Appendix A.

3.1.2 Tables

A listing of each of the tables in the MSS is given here. A brief definition of each of these tables follows including a listing of the columns comprising the table. The Column List indicates if the column is part of the primary key (PK) for the table. That is if the columns can be used alone or in combination with other primary key columns to uniquely identify a single row in the table. The column list also indicates whether the column is a mandatory column that must be included in every row.

Data requirements for MSS fall into five logical categories:

Order information - orders and requests placed for ECS products

Site information – information on the sites at which the database is housed

User Data – registered user information, user audit data, and user registration requests

Validation data – Domain definitions for codes used by MSS software

Versioning information – database schema version data

Table 3-1. Data Table Listing

Table Name	Logical Grouping
EcAcAddress	Order Information
EcAcOrder	Order Information
EcAcOrderId	Order Information
EcAcRequest	Order Information
EcAcRequestId	Order Information
EcDbDatabaseVersions	Versioning Information
EcMsDAACSites	Site Information
MsAcAffiliationCode	Validation Data
MsAcAsterCategory	Validation Data
MsAcDAACCCode	Validation Data
MsAcInternetAffiliationCode	Validation Data
MsAcMediaFormatCode	Validation Data
MsAcMediaTypeCode	Validation Data
MsAcOpPrivilege	Site Information
MsAcPriorityCode	Validation Data
MsAcResearchFieldCode	Validation Data
MsAcStatusCode	Validation Data
MsAcUsrAudit	User Data
MsAcUsrProfile	User Data
role_to_cots	User Data

Table 3-2 stores identifying address information per orderid.

Table 3-2. EcAcAddress

Name	Code	Type	PK	Mandatory
orderId	ORDERID	varchar(10)	No	Yes
title	TITLE	varchar(5)	No	No
firstName	FIRSTNAME	varchar(20)	No	Yes
middleInit	MIDDLEINIT	char(1)	No	No
lastName	LASTNAME	varchar(20)	No	Yes
organization	ORGANIZATION	varchar(60)	No	No
eMailAddr	eMailAddr	varchar(255)	No	No
mailAddrCity	mailAddrCity	varchar(35)	No	No
mailAddrCountry	mailAddrCountry	varchar(30)	No	No
mailAddrFax	mailAddrFax	varchar(22)	No	No
mailAddrPhone	mailAddrPhone	varchar(22)	No	No
mailAddrState	mailAddrState	varchar(20)	No	No
mailAddrStreet1	mailAddrStreet1	varchar(32)	No	No
mailAddrStreet2	mailAddrStreet2	varchar(32)	No	No
mailAddrStreet3	mailAddrStreet3	varchar(32)	No	No
mailAddrZip	mailAddrZip	varchar(15)	No	No
billAddrCountry	billAddrCountry	varchar(30)	No	No
billAddrFax	billAddrFax	varchar(22)	No	No
billAddrPhone	billAddrPhone	varchar(22)	No	No
billAddrState	billAddrState	varchar(20)	No	No
billAddrStreet1	billAddrStreet1	varchar(32)	No	No
billAddrStreet2	billAddrStreet2	varchar(32)	No	No
billAddrStreet3	billAddrStreet3	varchar(32)	No	No
billAddrCity	billAddrCity	varchar(35)	No	No
billAddrZip	billAddrZip	varchar(15)	No	No
billContactName_First	billContactName_First	varchar(20)	No	No
billContactName_Last	billContactName_Last	varchar(20)	No	No
billContactName_MI	billContactName_MI	char(1)	No	No
billContactOrg	billContactOrg	varchar(60)	No	No
billContactTitle	billContactTitle	varchar(5)	No	No
billEMailAddr	billEMailAddr	varchar(255)	No	No
ShipContactOrg	ShipContactOrg	varchar(60)	No	No

Table 3-3 stores the end-user's order information. The data is used to fill and ship the request and to track the status of the order. An order can have many requests, and it may not be associated

with a user in the MsAcUsrProfile table. (i.e. the order may ‘belong’ to a guest user). Data is stored indefinitely in the table.

Table 3-3. EcAcOrder (1 of 2)

Name	Code	Type	PK	Mandatory
abortedFlag	abortedFlag	char(1)	No	No
cancelledFlag	cancelledFlag	char(1)	No	No
darExpirationDateTime	darExpirationDateTime	datetime	No	No
darId	darId	varchar(15)	No	No
eMailAddr	eMailAddr	varchar(255)	No	No
externalRequestId	externalRequestId	varchar(50)	No	No
finishDateTime	finishDateTime	smalldatetime	No	No
firstName	firstName	varchar(20)	No	No
homeDAAC	homeDAAC	varchar(3)	No	No
lastName	lastName	varchar(20)	No	No
logicalLock	logicalLock	int	No	No
middleInit	middleInit	char(1)	No	No
orderDesc	orderDesc	varchar(50)	No	No
orderDistFormat	orderDistFormat	varchar(64)	No	No
orderGranule	orderGranule	numeric(9)	No	No
orderHomeDAAC	orderHomeDAAC	varchar(3)	No	Yes
orderId	orderId	varchar(10)	No	Yes
orderMedia	orderMedia	varchar(20)	No	No
orderPriority	orderPriority	varchar(10)	No	No
orderSource	orderSource	varchar(21)	No	No
orderStatus	orderStatus	varchar(30)	No	No
orderType	orderType	varchar(2)	No	No
receiveDateTime	receiveDateTime	smalldatetime	No	No
rpcId	rpcId	char(250)	No	No
shipAddrCity	shipAddrCity	varchar(35)	No	No
shipAddrCountry	shipAddrCountry	varchar(30)	No	No
shipAddrFax	shipAddrFax	varchar(22)	No	No
shipAddrPhone	shipAddrPhone	varchar(22)	No	No
shipAddrState	shipAddrState	varchar(20)	No	No
shipAddrStreet1	shipAddrStreet1	varchar(32)	No	No
shipAddrStreet2	shipAddrStreet2	varchar(32)	No	No
shipAddrStreet3	shipAddrStreet3	varchar(32)	No	No
shipAddrZip	shipAddrZip	varchar(15)	No	No
shipDateTime	shipDateTime	smalldatetime	No	No
standingOrderId	standingOrderId	varchar(10)	No	No

Table 3-3. EcAcOrder (2 of 2)

Name	Code	Type	PK	Mandatory
startDateTime	startDateTime	smalldatetime	No	No
timeOfLastUpdate	timeOfLastUpdate	smalldatetime	No	No
title	title	varchar(5)	No	No
userId	userId	varchar(14)	No	Yes

Table 3-4 is used to generate the next orderId for the DAAC identified in the ECMSDAACSITES table. At any given time, there must be only one row in this table.

Table 3-4. EcAcOrderId

Name	Code	Type	PK	Mandatory
orderId	orderId	numeric(10)	No	No

Table 3-5 stores the shipping and tracking data for an end-user's request. A user can place one or many requests for a given order.

Table 3-5. EcAcRequest (1 of 2)

Name	Code	Data Type	PK	Mandatory
ESDT_Id	ESDT_Id	varchar(20)	No	No
deleteRequestFlag	deleteRequestFlag	char(1)	No	Yes
destinationDirectory	destinationDirectory	varchar(255)	No	No
destinationNode	destinationNode	varchar(100)	No	No
deviceDensity	deviceDensity	varchar(20)	No	No
deviceId	deviceId	varchar(20)	No	No
eMailAddr	eMailAddr	varchar(255)	No	No
finishDateTime	finishDateTime	smalldatetime	No	No
firstName	firstName	varchar(20)	No	No
ftpAddress	ftpAddress	varchar(128)	No	No
ftpPassword	ftpPassword	varchar(50)	No	No
lastName	lastName	varchar(20)	No	No
mediaQuantity	mediaQuantity	numeric(3)	No	No
mediaType	mediaType	varchar(20)	No	No
middleInit	middleInit	char(1)	No	No
numBytes	numBytes	float(8)	No	No
numFiles	numFiles	numeric(9)	No	No
numGranule	numGranule	numeric(9)	No	No
orderHomeDAAC	orderHomeDAAC	varchar(3)	No	Yes
orderId	orderId	varchar(10)	No	Yes

Table 3-5. EcAcRequest (2 of 2)

Name	Code	Data Type	PK	Mandatory
parentId	parentId	varchar(10)	No	No
receiveDateTime	receiveDateTime	smalldatetime	No	No
requestDesc	requestDesc	varchar(50)	No	No
requestDistFormat	requestDistFormat	varchar(64)	No	No
requestId	requestId	varchar(10)	Yes	Yes
requestPriority	requestPriority	varchar(10)	No	No
requestProcessingDAAC	requestProcessingDAAC	varchar(3)	Yes	Yes
requestStatus	requestStatus	char(30)	No	No
requestType	requestType	varchar(2)	No	No
shipAddrCity	shipAddrCity	varchar(35)	No	No
shipAddrCountry	shipAddrCountry	varchar(30)	No	No
shipAddrFax	shipAddrFax	varchar(22)	No	No
shipAddrPhone	shipAddrPhone	varchar(22)	No	No
shipAddrState	shipAddrState	varchar(20)	No	No
shipAddrStreet1	shipAddrStreet1	varchar(32)	No	No
shipAddrStreet2	shipAddrStreet2	varchar(32)	No	No
shipAddrStreet3	shipAddrStreet3	varchar(32)	No	No
shipAddrZip	shipAddrZip	varchar(15)	No	No
shipDateTime	shipDateTime	smalldatetime	No	No
standingRequestId	standingRequestId	varchar(10)	No	No
startDateTime	startDateTime	smalldatetime	No	No
tapeFormat	tapeFormat	varchar(20)	No	No
timeOfLastUpdate	timeOfLastUpdate	smalldatetime	No	No
title	title	varchar(5)	No	No

Table 3-6 is used to generate the next requestId for the DAAC identified in the EcMsDAACsites table. At any given time, there must be only one row in this table.

Table 3-6. EcAcRequestId

Name	Code	Type	PK	Mandatory
requestId	requestId	numeric(10)	No	No

Table 3-7 identifies the current version level of the MSS database.

Table 3-7. EcDbDatabaseVersions

Name	Code	Type	PK	Mandatory
EcDbSchemaVersionId	EcDbSchemaVersionID	smallint	Yes	Yes
EcDbComments	EcDbComments	varchar(255)	No	No
EcDbCurrentVersionFlag	EcDbCurrentVersionFlag	char(1)	No	No
EcDbDatabaseName	EcDbDatabaseName	varchar(255)	No	No
EcDbDropDescription	EcDbDropDescription	varchar(255)	No	No
EcDbDropInstallDate	EcDbDropInstallDate	datetime	No	No
EcDbDropVersion	EcDbDropVersion	char(64)	Yes	Yes
EcDbSybaseServer	EcDbSybaseServer	varchar(255)	No	No
EcDbSybaseVersion	EcDbSybaseVersion	varchar(255)	No	No
EcDbUpdateProcess	EcDbUpdateProcess	varchar(255)	No	No

Table 3-8 holds the database's DAAC ID, DAAC short, DAAC longname, Current DAAC Flag. This table **must** be the identifier of the DAAC at which the database is installed.

Table 3-8. EcMsDAACSites

Name	Code	Type	PK	Mandatory
DAAC_Id	DAAC_Id	char(2)	Yes	Yes
DAAC_Long	DAAC_Long	varchar(120)	No	Yes
DAAC_Short	DAAC_Short	char(3)	Yes	Yes
This_DAAC	This_DAAC	char(1)	No	Yes

Table 3-9 (not currently used) is a lookup table that defines the list of user affiliations.

Table 3-9. MsAcAffiliationCode

Name	Code	Type	PK	Mandatory
AffiliationCode	AffiliationCode	varchar(16)	Yes	Yes
AffiliationDesc	AffiliationDesc	varchar(255)	No	No

Table 3-10 (not currently used) is a lookup table, it defines the list of Aster categories.

Table 3-10. MsAcAsterCategory

Name	Code	Type	PK	Mandatory
asterCategory	asterCategory	varchar(40)	No	No
asterCategoryId	asterCategoryId	numeric(2)	Yes	Yes

Table 3-11 (not currently used) is a lookup table; it lists all the DAACs abbreviations and names.

Table 3-11. MsAcDAACCode

Name	Code	Type	PK	Mandatory
DAACAbbrv	DAACAbbrv	varchar(3)	Yes	Yes
DAACLongName	DAACLongName	varchar(255)	No	No
DAACShortName	DAACShortName	varchar(10)	No	Yes

Table 3-12 (not currently used) is a lookup table; it lists all the internet affiliations.

Table 3-12. MsAcInternetAffiliationCode

Name	Code	Type	PK	Mandatory
InternetAffiliationCode	InternetAffiliationCode	varchar(14)	Yes	Yes
InternetAffiliationDesc	InternetAffiliationDesc	varchar(255)	No	No

Table 3-13 (not currently used) is a lookup table; it lists all the available media formats.

Table 3-13. MsAcMediaFormatCode

Name	Code	Type	PK	Mandatory
MediaFormatCode	MediaFormatCode	varchar(20)	Yes	Yes
MediaFormatDesc	MediaFormatDesc	varchar(255)	No	No

Table 3-14 (not currently used) is a lookup table; it lists all the media types available.

Table 3-14. MsAcMediaTypeCode

Name	Code	Type	PK	Mandatory
MediaTypeCode	MediaTypeCode	varchar(20)	Yes	Yes
MediaTypeDesc	MediaTypeDesc	varchar(255)	No	No

Table 3-15 is a lookup table; it defines the list of operator privileges.

Table 3-15. MsAcOpPrivilege

Name	Code	Type	PK	Mandatory
userId	userId	varchar(12)	Yes	Yes
homeDAAC	homeDAAC	varchar(3)	No	Yes

Table 3-16 (not currently used) is a lookup table; it defines the list of user request priority levels.

Table 3-16. MsAcPriorityCode

Name	Code	Type	PK	Mandatory
PriorityCode	PriorityCode	varchar(10)	Yes	Yes
PriorityDesc	PriorityDesc	varchar(255)	No	No

Table 3-17 (not currently used) is a lookup table; it defines the list of user research fields.

Table 3-17. MsAcResearchFieldCode

Name	Code	Type	PK	Mandatory
ResearchFieldCode	ResearchFieldCode	varchar(64)	Yes	Yes
ResearchFieldDesc	ResearchFieldDesc	varchar(255)	No	No

Table 3-18 (not currently used) is a lookup table; it defines the list order statuses.

Table 3-18. MsAcStatusCode

Name	Code	Type	PK	Mandatory
StatusCode	StatusCode	varchar(22)	Yes	Yes
StatusDesc	StatusDesc	varchar(255)	No	No

Table 3-19 is a lookup table; it defines the user audits.

Table 3-19. MsAcUsrAudit

Name	Code	Type	PK	Mandatory
DateTime	datetime	smalldatetime	No	No
activityType	activityType	varchar(20)	No	No
hostName	hostName	varchar(30)	No	Yes
location	location	varchar(20)	No	No
program	program	varchar(50)	No	No
status	status	varchar(15)	No	No
userId	userId	varchar(12)	No	Yes

Table 3-20 stores identifying, authenticating, and other data that is used by ECS servers to distribute data to registered users.

Table 3-20. MsAcUsrProfile (1 of 2)

Name	Code	Type	PK	Mandatory
ECSAuthenticator	ECSAuthenticator	varchar(32)	No	Yes
GTWYUsrType	GTWYUsrType	varchar(20)	No	No
accessPrivilege	accessPrivilege	varchar(8)	No	No
affiliation	affiliation	varchar(16)	No	No
asterCategory	asterCategory	numeric(2)	No	No
billAddrCity	billAddrCity	varchar(35)	No	No
billAddrCountry	billAddrCountry	varchar(30)	No	No
billAddrFax	billAddrFax	varchar(22)	No	No
billAddrPhone	billAddrPhone	varchar(22)	No	No
billAddrState	billAddrState	varchar(20)	No	No
billAddrStreet1	billAddrStreet1	varchar(32)	No	No
billAddrStreet2	billAddrStreet2	varchar(32)	No	No
billAddrStreet3	billAddrStreet3	varchar(32)	No	No
billAddrZip	billAddrZip	varchar(15)	No	No
billContactName_First	billContactName_First	varchar(20)	No	No
billContactName_Last	billContactName_Last	varchar(20)	No	No
billContactName_MI	billContactName_MI	char(1)	No	No
billContactOrg	billContactOrg	varchar(60)	No	No
billContactTitle	billContactTitle	varchar(5)	No	No
billEMailAddr	billEMailAddr	varchar(255)	No	No
category	category	varchar(7)	No	No
creationDate	creationDate	smalldatetime	No	No
darExpeditedData	darExpeditedData	bit	No	Yes
eMailAddr	eMailAddr	varchar(255)	No	No
expirationDate	expirationDate	smalldatetime	No	No
firstName	firstName	varchar(20)	No	Yes
homeDAAC	homeDAAC	varchar(3)	No	Yes
internetAffiliation	internetAffiliation	varchar(14)	No	No
lastName	lastName	varchar(20)	No	Yes
mailAddrCity	mailAddrCity	varchar(35)	No	No
mailAddrCountry	mailAddrCountry	varchar(30)	No	No
mailAddrFax	mailAddrFax	varchar(22)	No	No
mailAddrPhone	mailAddrPhone	varchar(22)	No	No
mailAddrState	mailAddrState	varchar(20)	No	No
mailAddrStreet1	mailAddrStreet1	varchar(32)	No	No
mailAddrStreet2	mailAddrStreet2	varchar(32)	No	No
mailAddrStreet3	mailAddrStreet3	varchar(32)	No	No
mailAddrZip	mailAddrZip	varchar(15)	No	No
middleInit	middleInit	char(1)	No	No

Table 3-20. MsAcUsrProfile (2 of 2)

Name	Code	Type	PK	Mandatory
motherMaidenName	motherMaidenName	varchar(20)	No	No
nasaUser	nasaUser	char(1)	No	Yes
organization	organization	varchar(60)	No	No
privilegeLevel	privilegeLevel	varchar(10)	No	No
projectName	projectName	varchar(30)	No	No
researchField	researchField	varchar(64)	No	No
shipAddrCity	shipAddrCity	varchar(35)	No	No
shipAddrCountry	shipAddrCountry	varchar(30)	No	No
shipAddrFax	shipAddrFax	varchar(22)	No	No
shipAddrPhone	shipAddrPhone	varchar(22)	No	No
shipAddrState	shipAddrState	varchar(20)	No	No
shipAddrStreet1	shipAddrStreet1	varchar(32)	No	No
shipAddrStreet2	shipAddrStreet2	varchar(32)	No	No
shipAddrStreet3	shipAddrStreet3	varchar(32)	No	No
shipAddrZip	shipAddrZip	varchar(15)	No	No
shipContactName_First	shipContactName_First	varchar(20)	No	No
shipContactName_Last	shipContactName_Last	varchar(20)	No	No
shipContactName_MI	shipContactName_MI	char(1)	No	No
shipContactOrg	shipContactOrg	varchar(60)	No	No
shipContactTitle	shipContactTitle	varchar(5)	No	No
shipEMailAddr	shipEMailAddr	varchar(255)	No	No
title	title	varchar(5)	No	No
userId	userId	varchar(14)	Yes	Yes

Table 3-21 defines operator's roles with accessible cots.

Table 3-21. role_to_cots

Name	Code	Type	PK	Mandatory
cots_list	cots_list	varchar(255)	No	No
roleID	roleID	varchar(15)	Yes	Yes

3.1.3 Columns

Brief definitions of each of the columns present in the database tables defined above are contained herein.

Table 3-22. Column Description (1 of 12)

Column Name	Column Description	Valid Values
abortedFlag	This column indicates whether an order has been aborted.	Y = Yes N = No
accessPrivilege	The highest priority level a user can give his or her order.	
activityType	The type of event that is taken place.	
affiliation	This column contains the user's affiliation.	Gov. Research Government Other Univ. Research Univ. Class Work Commercial Kinder.-12 GradeNo
AffiliationCode	This is the user's affiliation code.	
AffiliationDesc	This column contains the long description of the affiliation code.	
asterCategory column In MsAcAsterCategory table	This is the description of the aster category id.	
asterCategory column in in MsAcUsrProfile table.	This column contains the user's aster category id.	
asterCategoryId	This column defines an aster category identifier.	
billAddrCity	This is the user's city, for billing purposes.	
billAddrCountry	This is the user's country, for billing purposes.	
billAddrFax	This is the user's fax number, for billing purposes.	
billAddrPhone	This is the user's phone number, for billing purposes.	
billAddrState	This is the user's state address, for billing purposes.	
billAddrStreet1	This is the user's street address, for billing purposes.	

Table 3-22. Column Description (2 of 12)

Column Name	Column Description	Valid Values
billAddrStreet2	This is the user's street address, for billing purposes. Used only if address street is longer than what can be accommodated in billAddrStreet1.	
billAddrStreet3	This is the user's street address, for billing purposes. Used only if address street is longer than what can be accommodated in billAddrStreet2.	
billAddrZip	This is the user's zip code address, for billing purposes.	
billContactName_First	The first name of the billing contact.	
billContactName_Last	The last name of the billing contact.	
billContactName_MI	The middle initial of the billing contact.	
billContactOrg	The organization name associated with billing contact.	
billContactTitle	The title of the billing contact	
billEMailAddr	The email address for the billing contact.	
cancelledFlag	This is the ASTER privilege category ID.	Y=Yes N=No
category	This is the date that the userid was created.	
cots_list	Identification for the DAAC.	
creationDate	This is the date that the userid was created.	
DAAC_Id	Identification for the DAAC.	

Table 3-22. Column Description (3 of 12)

Column Name	Column Description	Valid Values
DAAC_Long	This is the DAAC's long name.	Alaska SAR Facility Consortium for International Earth Science Information Network EROS Data Center Goddard Space Flight Center Jet Propulsion Laboratory Langley Research Center National Snow and Ice Data Center Oak Ridge National Laboratory
DAAC_Short	This is the short name abbreviation of the DAAC's.	ASF CSN EDC GSF JPL LAR NSC ORN
DAACAbbrv	This is the 3-letters name abbreviation of the DAAC's (same values as DAAC_Short).	ASF CSN EDC GSF JPL LAR NSC ORN PVC
DAACLongName	This is the DAAC's long name.	Alaska SAR Facility Consortium for International Earth Science Information Network EROS Data Center Goddard Space Flight Center Jet Propulsion Laboratory Langley Research Center National Snow and Ice Data Center Oak Ridge National Laboratory

Table 3-22. Column Description (4 of 12)

Column Name	Column Description	Valid Values
DAACShortName	This is the short name abbreviation of the DAAC's.	ASF CSN EDC GSF JPL LAR NSC ORN PVC
darExpeditedData	This column is false if the user is not allowed to submit DARs that request expedited data. The column is true if the user is allowed to submit DARs that request expedited data.	0=False 1=True
darExpirationDateTime	This column is the time the Data Acquisition Request Id will expire.	
darId	This column is the Data Acquisition Request Id for a particular Stranding Order.	
DateTime	The date that the activity has taken place.	
deleteRequestFlag	Notes whether or not a request should be deleted.	
destinationDirectory	This column holds the user's destination directory for ftp acquires.	
destinationNode	This column holds the user's destination node for ftp acquires.	
deviceDensity	This column holds the request's device density.	
deviceid	This column holds the requests' device ID.	
EcDbComments	Notes or comments on the database version level.	
EcDbCurrentVersionFlag	Flag indicating if this row represents the current database version entry.	0 = no 1 = yes
EcDbDatabaseName	The name of the database for which this database versions level is applied.	

Table 3-22. Column Description (5 of 12)

Column Name	Column Description	Valid Values
EcDbDropDescription	The official name of the ECS software drops for this database version level.	
EcDbDropInstallDate	The date and time that the database versions level was installed.	
EcDbDropVersion	The official description of the ECS software drops for this database version level.	
EcDbSchemaVersionId	The subsystem-specific identifier for this database schema version.	
EcDbSybaseServer	The name of the baseline Sybase SQL server controlling this database.	
EcDbSybaseVersion	The software release version of the Sybase SQL server in place when this database version level was initially installed.	
EcDbUpdateProcess	The installation method by which this database version level was installed.	
ECSAuthenticator	Authentication entry for the user used to authenticate access.	
eMailAddr	The user's email address.	
ESDT_Id	This name will identify the short name associated with the collection or granule.	
expirationDate	This is the expiration date of the user's profile. (i.e. account)	
externalRequestId	A SIPS-generated identifier that uniquely defines an order generated through the Machine-to-Machine Gateway.	
finishDateTime	The column contains the time when all requests for the order have been completed.	
firstName	This is the user's first name.	

Table 3-22. Column Description (6 of 12)

Column Name	Column Description	Valid Values
ftpAddress	This column holds a request's ftp staging address.	
ftpPassword	This column holds the ftp password for the staging request.	
GTWYUsrType	For registered users, the gateway will retrieve their user profile and check this attribute. If is filled, it will use GTWYUsrType and a generated password to log the user into DCE (rather than the userID attribute). A DCE account for GTWYUsrType must exist with the current V0GwPwd as its password.	DAACOPS - DAAC Operations User ECSDEV - ECS Development User V0CERES - V0 CERES User GUEST - Guest User
homeDAAC	The name of the DAAC, where the request for a user profile was processed.	
hostName	Identifies the host site.	
internetAffiliation	The column contains the user's internet affiliation.	
InternetAffiliationCode	The column contains the user's internet affiliation.	
InternetAffiliationDesc	This column contains a description for an internet affiliation code.	
lastName	This is the user's last name.	
location	Indicates the area of the activity.	
logicalLock	Used to lock an order associated with a request that will be updated.	Default value is "0"
mailAddrCity	This is the user's mailing city address.	
mailAddrCountry	This is the user's mailing country address.	
mailAddrFax	This is the user's contact fax number.	
mailAddrPhone	This is the user's contact phone number.	
mailAddrState	This is the user's mailing state address.	

Table 3-22. Column Description (7 of 12)

Column Name	Column Description	Valid Values
mailAddrStreet1	This is the user's mail street address.	
mailAddrStreet2	This is the user's mail street address. Used only if address street length is longer than what can be accommodated in mailAddrStreet1.	
mailAddrStreet3	This is the user's mail street address. Used only if address street length is longer than what can be accommodated in mailAddrStreet2.	
mailAddrZip	This is the user's mail zip code address.	
MediaFormatCode	This is the type of media format.	
MediaFormatDesc	This is the description of the media format.	
mediaQuantity	The number of media requested for an order.	
mediaType	This column describes the media type of request distribution.	
MediaTypeCode	This column identifies the media type of request distribution.	
MediaTypeDesc	This is the description of a media type.	
middleInit	This column holds the user's middle name.	
motherMaidenName	This is the user's mother's maiden name, recorded for security reasons.	
nasaUser	This field identifies whether a user works for NASA and his level of access to NASA data.	
numBytes	This column contains the number of bytes of a request.	
numFiles	This column contains the number of files that fill a request.	

Table 3-22. Column Description (8 of 12)

Column Name	Column Description	Valid Values
numGranule	This column contains the number of granules that fill a request.	
orderDesc	This column holds a description of the user's order.	
orderDistFormat	This column holds the media format of the user's order.	
orderGranule	This column contains the number of granules that fill an order.	
orderHomeDAAC	This column is passed from EcAcOrder, this is the home DAAC where the order was placed (same values as DAAC_Short).	
orderId	This column identifies an order.	
orderMedia	This column holds the media type of the user's order.	
orderPriority	This column holds the priority of the user's order.	
orderSource	This column holds the where the source of the order.	
orderStatus	This column holds the current status of an order.	Pending, Operator Intervention, Staging, Transferring, Waiting For Shipment, Shipped, Aborted, Canceled, Terminated, Subsetting, Subsetting Staging, Prep for Distribution, SDSRV Staging, Queued, Waiting for data, Waiting for processing, Being Processed, Completed processing, Expired, Awaiting L1B, L1B received.
orderType	The type of an order	-On Demand (valid value: PR) -Standing On Demand (valid value: ST) -MTMGW (valid value: MM) -Regular orders (valid value: blank)
organization	This is the user's organization.	

Table 3-22. Column Description (9 of 12)

Column Name	Column Description	Valid Values
parentId	A request can be broken into subrequests, and this column holds the ID for that request.	
PriorityCode	Defines a list of possible priority values.	
PriorityDesc	This is the description of a request priority code.	
privilegeLevel	This column contains the highest priority level a user can give his or her order.	
program	This is the user's program name.	
projectName	This is the user's project name.	
receiveDateTime	This attribute holds the time the order and/or request was submitted (i.e., created) to the SDSRV, set by the V0 Gateway when it created the EcAcRequest.	
requestDesc	This column holds the request's description.	
requestDistFormat	This column holds the distribution media format.	
requestId	This column holds the identifier for a request.	
requestPriority	This column holds the user's request priority.	
requestProcessingDAAC	The site at which the order is actually being processed.	
requestStatus	This column holds the user's request status.	
requestType	This column identifies the type of request received or the type of request to be triggered by a subscription (e.g., "Notification ftp-pull").	
researchField	This is the research field available in the system.	
ResearchFieldCode	This is the research field available in the system.	
ResearchFieldDesc	This is the research field description.	

Table 3-22. Column Description (10 of 12)

Column Name	Column Description	Valid Values
roleID	The column contains an operator's role.	
rpclD	This column contains the ID of the RPC generated by the MTMGW before sending an acquire request to SDSRV. The MSS Accountability Service shall keep an external request ID and a rpcID as part of the order tracking information.	
shipAddrCity	This is the user's city address to where the request will be shipped.	
shipAddrCountry	This is the user's country address to where the request will be shipped.	
shipAddrFax	This is the user's fax number to where the request will be shipped.	
shipAddrPhone	This is the user's phone address to where the request will be shipped.	
shipAddrState	This is the user's state address to where the request will be shipped.	
shipAddrStreet1	This is the user's street address to where the request will be shipped.	
shipAddrStreet2	This is the user's street address to where the request will be shipped. Used only when street address length is longer than what can be accommodated in shipAddrStreet1.	
shipAddrStreet3	This is the user's street address to where the request will be shipped. Used only when street address length is longer than what can be accommodated in shipAddrStreet2.	

Table 3-22. Column Description (11 of 12)

Column Name	Column Description	Valid Values
shipAddrZip	This is the user's zip code address to where the request will be shipped.	
shipContactName_First	This is the user's first name where request will be shipped.	
shipContactName_Last	This is the user's last name where request will be shipped.	
shipContactName_MI	This is the user's middle initial where request will be shipped.	
shipContactOrg	This is the user's organization name where request will be shipped.	
shipContactTitle	This is the user's title where request will be shipped.	
shipDateTime	This column hold the time the last request for the order was shipped, this time is set by MSS when propagating request status to the order.	
shipEMailAddr	This is the user's email address where request will be shipped.	
standingOrderId	ID of a standing order.	
standingRequestId	ID of a standing request.	
startTime	This column holds the time set by DDIST to the first time DDIST started to process the request, i.e., start the staging of its data, and the request status.	
status	The status of a user's request for a user profile establishment.	
StatusCode	This is the status of a request (same values as orderStatus).	
StatusDesc	This is the request status code's description.	
tapeFormat	This column holds the format of the tape for the request.	

Table 3-22. Column Description (12 of 12)

Column Name	Column Description	Valid Values	
This_DAAC	Ids the DAAC where work processed.		
timeOfLastUpdate	This column holds the time of the last order or request update.		
title	This is the title of a user. (i.e., Dr.)	Dr Mr Ms Miss Mrs. Rev Sr	Doctor Mister Miss/Mrs. Miss Mrs. Reverend Senior
userId	This column uniquely identifies a registered user.		

3.1.4 Column Domains

Domains specify the ranges of values allowed for a given table column. Sybase supports the definition of specific domains to further limit the format of data for a given column. Sybase domains are, in effect, user-defined data types. There are no domains defined for the MSS databases.

3.1.5 Rules

Sybase supports the definitions of rules. Rules provide a means for enforcing domain constraints on a given column. All rules defined in Sybase for the MSS database are described herein.

There are no rules defined in the MSS databases.

3.1.6 Defaults

Defaults are used to supply a value for a column when one is not defined at insert time. All defaults defined in Sybase in the MSS database are described herein.

The following defaults are defined in the MSS database:

- EcAcOrder.orderSource defaults to “Unknown”
- EcAcOrder.orderStatus defaults to “Pending”
- EcAcOrder.logicalLock defaults to 0
- EcAcRequest.deleteRequestFlag defaults to ‘N’
- MsAcUsrProfile.nasaUser defaults to ‘N’

3.1.7 Views

Sybase allows the definition of views as a means of limiting an application or users access to data in a table or tables. Views create a logical table from columns found in one or more tables. There are no views defined for MSS.

3.1.8 Integrity Constraints

Sybase allows the enforcement of referential integrity via the use of declarative integrity constraints. Integrity constraints allow the SQL server to enforce primary and foreign key integrity checks. Sybase 11 is only ANSI-92 compliant, however, therefore its constraints support “restrict-only” operations. This means that a row cannot be deleted or updated if there are rows in other tables having a foreign key dependency on that row. Cascade delete and update operations can not be performed if a declarative constraint has been used.

The following declarative integrity constraints are defined in the MSS database:

- fk_orderId – EcAcRequest foreign key (orderId) references EcAcOrder (orderId)
- fk_addressordid – EcAcAddress foreign key (orderId) references EcAcOrder (orderId)

3.1.9 Triggers

Sybase supports the enforcement of business policy via the use of triggers. A trigger is best defined as set of activities or checks that should be performed automatically whenever a row is inserted, updated, or deleted from a given table. Sybase allows the definition of insert, update, and delete trigger per table. A listing of each of the triggers in the MSS database is given in Table 3-23. A brief definition of each of these triggers follows. Trigger implementation may vary by drop/patch and therefore is not listed here.

Table 3-23. Trigger Listing

Table Code	Trigger Name	Trigger Type
EcAcOrder	TrigUpdEcAcOrder	UpdateTrigger
EcAcRequest	TrigInsEcAcRequest	InsertTrigger
EcAcRequest	TrigUpdEcAcRequest	UpdateTrigger
MsAcOpPrivilege	TrigUpdMsAcOpPrivilege	UpdateTrigger
MsAcUsrProfile	TrigInsUpdMsAcUsrProfile	Insert/Update Trigger
MsAcUsrProfile	TrigDelMsAcUsrProfile	DeleteTrigger

3.1.10 Stored Procedures

Sybase also includes support for business policy via the use of stored procedures. Stored procedures are typically used to capture a set of activities or checks that will be performed on the database repeatedly to enforce business policy and maintain data integrity. Stored procedures are parsed and compiled SQL code that reside in the database and may be called by name by an

application, trigger or another stored procedure. A listing of each the stored procedures in the MSS database is given in Table 3-24. A brief definition of each of these stored procedures follows. Stored procedure implementation may vary by drop/patch and therefore is not listed here.

Table 3-24. Procedure Listing (1 of 2)

Name	Description
datawarning	Notifies DBA when a data segment threshold is crossed.
logdump	Dump the log when log segment threshold is crossed.
logwarning	Notify the DBA when log segment approaches capacity threshold.
ProcCreateNewRequest	Used by OMS to create new requests from V0GTWY
ProcCreateNewOrder	Used by OMS to create new orders from V0GTWY
ProcGetShipAddress	Retrieves shipping information
ProcInsEcAcRequest	Used by OMS Gui to create new requests during partitioning
ProcDecrementEcAcRequestId	Decrements the request ID by 1
ProcDecrementOrderId	Decrements the order ID by 1
ProcIncrementEcAcRequestId	Increments the request ID by 1
ProcIncrementOrderId	Increments the order ID by 1
ProcGetOrderStatusEmail	Retrieves orderStatus and emailAddress for an order
ProcInsEcAcOrder	Inserts a new row into EcAcOrder
ProcUpdBOResult	Updates a bundling order request
ProcUpdEcAcRequest	Updates a request
ProcUpdFtpMediaTypeInfo	Updates FTP-related information for a request
ProcUpdPdsRequest	Called by PDS to update a request
ProcUpdRequestInfo	Updates a request (certain fields only)
ProcUpdRequestPriority	Updates the priority of a request
ProcUpdRequestStatus	Updates the requestStatus of a request
ProcUpdateShipAddress	Updates shipping address information
ProcValidateDAAC	Validates the DAAC name associated with the caller
ProcGetInsEcAcOrder	Inserts a new order and selects the orderId
ProcGetInsEcAcRequest	Inserts a new request and selects the requestId
ProcGetOrderByExReqId	Retrieves information about an order based on its external request ID
ProcGetOrderByExReqIdAndUsrId	Gets order information based on both external requestId and userId
ProcGetOrderByOrderId	Gets order information based on the orderId
ProcGetOrderByStOrderId	Gets order information based on standing order ID
ProcGetOrderByUsrName	Gets order information based on first and last name
ProcGetRequestByOrderId	Gets request information based on orderId
ProcGetRequestByReqId	Gets request information based on requestId
ProcGetRequestByUsrName	Gets request information based on first and last name
ProcUpdEcAcOrder	Updates order information based on orderId

Table 3-24. Procedure Listing (2 of 2)

Name	Description
ProcUpdOrderStatus	Updates order status based on orderId
ProcIdInEMChecksumUsers	Determines if user or request should get checksum info in email

3.2 Flat File Usage

A flat file is an operating system file that is written and subsequently read, generally independent of other files that exist, and usually static in nature. There are cases when the implementation of persistent data is better suited to a flat file than to a database.

3.2.1 Files Definitions

Not Applicable

3.2.2 Attributes

Not Applicable

3.2.3 Attribute Domains

Not Applicable

4. Performance and Tuning Factors

4.1 Indexes

An index provides a means of locating a row in a database table based on the value of a specific column(s), without having to scan all data in the table. When properly implemented, indexes can significantly decrease the time it takes to retrieve data, thereby increasing performance. Sybase allows the definition of two types of indexes, clustered and non-clustered.

In a clustered index, the rows in a database table are physically stored in sequence-determined by the index. Clustered indexes are particularly useful, when the data is frequently retrieved in sequential order. Only one clustered index may be defined per table.

Non-clustered indexes differ from their clustered counterpart, in that, data is not physically stored in sorted order—newly added rows are stored at the end of the related database table.

A key of the types of indexes found in MSS is provided in Table 4-1 Index Type Key. A list a description of each of the defined indexes is given in Table 4-2 Index List.

Table 4-1. Index Type Key

Index Type Key	Description
P	Primary Key
F	Foreign Key
U	Unique - Only one for the column code combination
C	Clustered or non-clustered index

Table 4-2. Index List

Table	Code	P	F	U	C
EcAcOrder	EcAcOrderOrderIdx	NO	NO	YES	YES
EcAcOrder	EcAcOrderExtReqIdx	NO	NO	NO	YES
EcAcOrder	EcAcOrderUserIdx	NO	NO	NO	YES
EcAcOrder	EcAcOrderOrderTypeIdx	NO	NO	NO	YES
EcAcOrder	EcAcOrderStandOrdIdx	NO	NO	NO	YES
EcAcOrder	EcAcOrderNamesIdx	NO	NO	NO	YES
EcAcRequest	EcAcRequestPkIdx	YES	NO	YES	YES
EcAcRequest	EcAcRequestOrderIdx	NO	NO	NO	YES
EcAcRequest	EcAcRequestReceiveIdx	NO	NO	NO	YES
EcAcRequest	EcAcRequestdNodeIdx	NO	NO	NO	YES
EcAcRequest	EcAcRequestStatusIdx	NO	NO	NO	YES
EcDbDatabaseVersions	PK_MSACVERSIONS	YES	NO	YES	YES
EcMsDAACSites	EcMsDAACSi_160030881	NO	NO	YES	YES
MsAcAffiliationCode	PK_MSACAFFILIATIONCODE	YES	NO	YES	YES
MsAcAsterCategory	PK_MSACASTERCATEGORY	YES	NO	YES	YES
MsAcDAACCCode	PK_MSACDAACCODE	YES	NO	YES	YES
MsAcInternetAffiliationCode	PK_MSACINTERNETAFFILIATIONCODE	YES	NO	YES	YES
MsAcMediaFormatCode	PK_MSACMEDIAFORMATCODE	YES	NO	YES	YES
MsAcMediaTypeCode	PK_MSACMEDIATYPECODE	YES	NO	YES	YES
MsAcOpPrivilege	MsAcOpPriv_3680043421	NO	NO	YES	YES
MsAcPriorityCode	PK_MSACPRIORITYCODE	YES	NO	YES	YES
MsAcResearchFieldCode	PK_MSACRESEARCHFIELDCODE	YES	NO	YES	YES
MsAcStatusCode	PK_MSACSTATUSCODE	YES	NO	YES	YES
MsAcUsrAudit	MsAcUsrAuditActivityTypeIdx	NO	NO	NO	YES
MsAcUsrAudit	MsAcUsrAuditDateTimelidx	NO	NO	NO	YES
MsAcUsrAudit	MsAcUsrAuditHostNameIdx	NO	NO	NO	YES
MsAcUsrAudit	MsAcUsrAuditLocationIdx	NO	NO	NO	YES
MsAcUsrAudit	MsAcUsrAuditProgramIdx	NO	NO	NO	YES
MsAcUsrAudit	MsAcUsrAuditStatusIdx	NO	NO	NO	YES
MsAcUsrAudit	MsAcUsrAuditUserIdx	NO	NO	NO	YES
MsAcUsrProfile	MsAcUserProfileNameIdx	NO	NO	NO	YES
MsAcUsrProfile	MsAcUserProfilePkIdx	NO	NO	YES	YES
MsAcUsrProfile	UserProfileAlt_1	NO	NO	YES	YES
MsAcUsrProfile	UserProfilehomeDaacIdx	NO	NO	NO	YES
MsAcUsrProfile	UserProfileGTWYUsrIdx	NO	NO	NO	YES
role_to_cots	role_to_co_6080051971	NO	NO	YES	YES

4.2 Segments

Sybase supports the declaration of segments. A segment is a named pointer to a storage device(s). Segments are used to physically allocate a database object to a particular storage device. Segments defined for the MSS and all other subsystem databases are described in Table 4-3.

Table 4-3. Segment Descriptions

Segment Name	Description
default	Default data segment used if no other segment specified in the create statement.
logsegment	SYSLOGS, Transaction Logs.
systemsegment	System tables and indexes.

4.3 Caches

A cache is a block of memory that is used by Sybase to retain and manage pages that are currently being processed. By default, each database contains three caches:

Data cache – retains most recently accessed data and index pages

Procedure cache – retains most recently accessed stored procedure pages

User transaction log cache – transaction log pages that have not yet been written to disk for each user

The size of each of these default caches is a configurable item, which must be managed on a per DAAC basis. These caches may be increased or decreased by the DAAC DBA as needed.

The data cache can be further subdivided into named caches. A named cache is a block of memory that is named and used by the DBMS to store data pages for select tables and/or indexes. Assigning a database table to named cache causes accessed pages to be loaded into memory and retained. The named cache does not need to be allocated to accommodate the entire database table since the DBMS manages the cache according to use. Named caches greatly increase performance by eliminating the time associated for disk input and output (I/O). There are no named caches that are currently defined for the MSS Subsystem database. Named caches may be defined as the memory usage of the MSS database becomes better known and the DAACs move into an operational environment. As named caches are defined this portion of the document will be updated.

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5. Database Security

5.1 Approach

The database security discussed within this section is bounded to security implementation within the Sybase SQL Server DBMS. A Sybase general approach to security is adopted as illustrated in Figure 5-1.

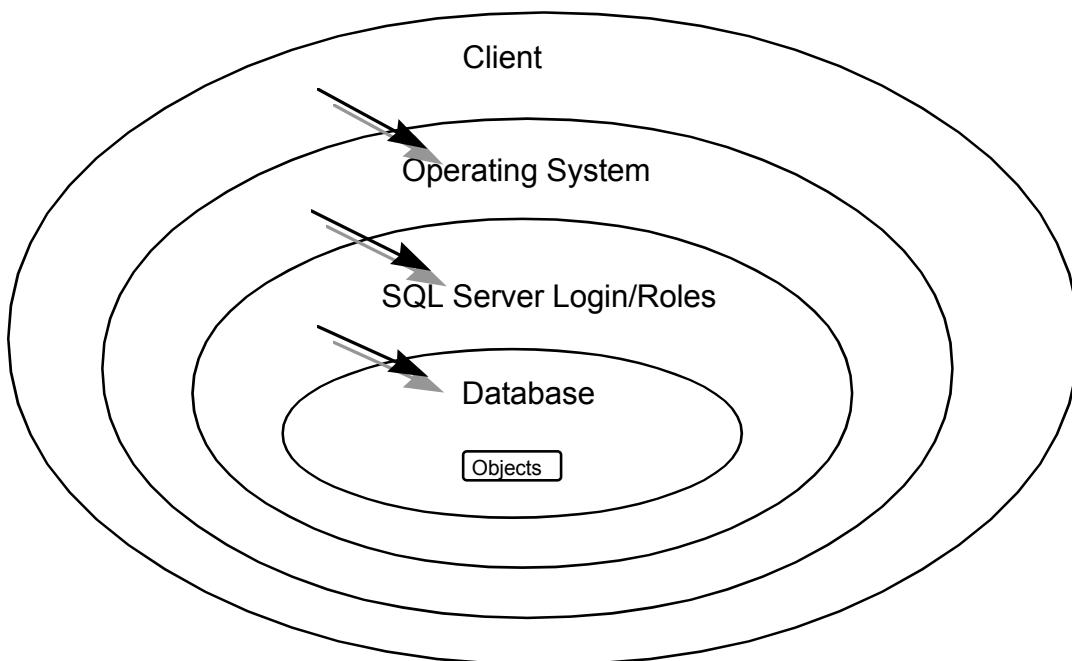


Figure 5-1. Sybase General Approach to SQL Server Security¹

The client (user) requires a SQL Server login to access the DBMS. The login is assigned to a user with certain related permissions for gaining access to particular objects (e.g., database tables, views, commands) within the database. The System Administrator may grant or revoke objects permissions for a login individually or based on defined group or roles.

Groups are a means of logically associating users with similar data access needs. Once a group has been defined, object and command permissions can be granted to that group. A user who is member of a group inherits all of the permissions granted to that group. No groups have been initially defined in the MSS Subsystem “default database. The DAACs should define database

¹ Reference Sybase Student Guide: *Advanced SQL Server Administration*.

groups to support the database security requirements of their individual DAACs. Assigning each user to the appropriate group should control security for local DAAC users.

Roles were introduced in Sybase to allow a structured means for granting users the permissions needed to perform standard database administration activities and also provide a means for easily identifying such users. There are six pre-defined roles that may be assigned to a user. A definition of each of these roles follows, as well as a description of the types of activities that may be performed by each role.

System Administrator (*sa_role*): This role is used to grant a specific user permissions needed to perform standard system administrator duties including:

- installing SQL server and specific SQL server modules
- managing the allocation of physical storage
- tuning configuration parameters
- creating databases

Site Security Officer (*sso_role*): This role is used to grant a specific user the permissions needed to maintain SQL server security including:

- adding server logins
- administrating passwords
- managing the audit system
- granting users all roles except the *sa_role*

Operator (*oper_role*): This role is used to grant a specific user the permissions needed to perform standard functions for the database including:

- dumping transactions and databases
- loading transactions and databases

Navigator (*navigator_role*): This role is used to grant a specific user the permissions needed to manage the navigation server.

Replication (*replication_role*): This role is used to grant a specific user the permissions needed to manage the replication server.

Sybase Technical Support (*sybase_ts_role*): This role is used to grant a specific user the permissions needed to execute *database consistency checker* (*dbcc*), a Sybase supplied utility supporting commands that are normally outside of the realm of routine system administrator activities.

The DAACs should review these roles and assign them to the appropriate login and/or groups.

5.2 Login/Group Object Permissions

During initial database installation logins used by the ECS custom code were created and permissions assigned for access to the MSS Subsystem database. In addition, special database installation login, mss_role, was created to support database installation needs. For each login, the level of access is limited to that associated with their login, group or assigned group/role. Object Permissions are set within the installation scripts of the MSS subsystem for each object and group/role.

Permissions are identified in Table 5-1. A specification of the object permissions is contained in Table 5-3. Table 5-2 maps users to groups or roles. Table 5-3 details object permissions for a group or role.

Table 5-1. Permission Key

Permission	Description
A	All
S	Select
I	Insert
U	Update
D	Delete
E	Execute

Table 5-2. Group/Role Assignments (1 of 2)

Group/Role	Assigned Users
AcctGroup	EcAcOrderManager EcCsMtMGateway EcCsMtMGateway_1 EcCsMtMGateway_2 EcCsMtMGateway_3 EcDmV0ToEcsGateway EcDsDistributionServer EcMsAcOrderSrvr EcMsAcRegUserSrvr EcOmGui EcOmOrderManager MsAcManager OmSriCliDriver
ClientGroup	EcCIDtDesktopDaacUser
RepGroup	"No users assigned"
DDIST_Group	EcDsEPD

Table 5-2. Group/Role Assignments (2 of 2)

Group/Role	Assigned Users
NBSRV_Group	EcNbSubscriptionCLI EcNbSubscriptionGUI EcNbActionDriver
PDS_Group	PDS
DPL_Group	EcDIWebAccess

Table 5-3. Object Permissions

Group/Role	Object	A	S	I	U	D	E
AcctGroup	ProlntermentEcAcRequestId						X
	ProlntermentOrderId						X
	EcAcOrder	X	X	X	X		
	EcAcRequest	X	X	X	X		
	MsAcAffiliationCode		X	X	X		
	MsAcDAACode		X	X	X		
	MsAcInternetAffiliationCode		X	X	X		
	MsAcMediaFormatCode		X	X	X		
	MsAcMediaTypeCode		X	X	X		
	MsAcPriorityCode		X	X	X		
	MsAcResearchFieldCode		X	X	X		
	MsAcStatusCode		X	X	X		
	MsAcUsrAudit		X	X	X		
	MsAcUsrProfile	X	X	X	X		
	MsAcUsrRequest	X	X	X	X		
ClientGroup	Role_to_cots			X	X	X	
DDIST_Group	EcAcOrder	X					
	EcAcRequest	X			X		
	MsAcUsrProfile	X					
PDS_Group	EcAcRequest	X					
	MsAcUsrProfile	X					
	EcAcOrder	X			X		
RepGroup	MsAcUsrProfile	X	X	X	X		
NBSRV_Group	MsAcUsrProfile	X					
	EcAcAddress	X	X				
	EcAcOrder	X	X	X			
	EcAcRequest	X	X	X			
DPL_Group	EcAcAddress	X	X				
	EcAcOrder	X					
	EcAcRequest	X					

6. Scripts

The scripts identified in this section may be found in the directory named /ecs/formal/MSS/ddm_mss_support/scripts.

6.1 Installation Scripts

Scripts used to support installation of the MSS Subsystem database are listed in Table 6-1.

Table 6-1. Installation Scripts

Script File	Description
EcMsDbBuild	Create a new initialized MSS database.
EcMsDbPatch	Upgrade an existing MSS database to the next valid database version level.
EcMsDbDump	Dump a specified MSS database on demand.
EcMsDbLoad	Load a specified <SUBSYS> database on demand.

6.2 De-Installation Scripts

Scripts used to support de-installation of the MSS Subsystem database are listed in Table 6-2.

Table 6-2. De-Installation Scripts

Script File	Description
EcMsDbDrop	Drop all objects in the specified MSS database.

6.3 Backup and Recovery Scripts

Scripts used to perform backup and recovery of the MSS Subsystem database are listed in Table 6-3. These are configured to run automatically using the Unix cron facility. Transaction logs dumps (incremental dumps) are performed 3 times each day. Database dumps (full database dumps) are performed once each day.

Table 6-3. Backup and Recovery Scripts

Script File	Description
Eccodbsyb_DumpDb	Dumps all databases for managed by the SQL server instance.
Eccodbsyb_DumpTran	Dumps the transaction log for all databases managed by the SQL server.

6.4 Miscellaneous Scripts

Miscellaneous scripts applicable to the MSS Subsystem database are listed in Table 6-4.

Table 6-4. Miscellaneous Scripts and Input Data Files

Script	Description
EcCoDbSyb_CkErrorLog	Checks the error log for error messages warranting DBO attention.
EcCoDbSyb_DbStat	Updates index statistics for each table in the selected database.
EcCoDbSyb_DboMail	Emails DBA error notification via e-mail. Used by EcCoDbSyb_DumpDb/Tran and EcCoDbSyb_CkErrorLog scripts.

7. Replication

7.1 Replication Overview

Replication as the name implies is a set of Sybase products that allow replication of data from one database to another. The MSS database employs replication to support its data distribution requirements. In order for replication to be accomplished the data source must define the tables and columns that may be replicated to a data recipient. These definitions are referred to as replication definitions. In the same manner a data recipient must specify the replication definitions in which he is interested. These specifications are referred to as replication subscriptions. In addition the replication database and server must be configured to support the potentially large volumes of data that will be transferred between the source and recipient databases. Each of these important parameters is outlined in detail below.

The Replication Definition and Subscription scripts for MSS were developed as templates. These templates will be installed at the DAAC site or SMC. Since peer-to-peer configuration for MsAcUsrProfile is required, the template approach was decided so that only those scripts that need to be implemented at each site are configured. The template files provide the necessary generic functions needed to configure the MSS MsAcUsrProfile replication environment. Unix shell scripts have been developed to allow installers to pass the appropriate site-specific information (i.e. database name, replicate replication server name, etc.) when prompted. The Unix script then customizes the template script files for the specific site. Listed below are the templates for Replication definitions and subscriptions for MSS's MsAcUsrProfile table.

The Data Development and Management (DD&M) group has created naming conventions for all replication scripts and naming conventions for the subscriptions, replication definitions, and other objects related to the ECS replication environment. Script names consist of the following conventions:

<action>.<SUBSYS>.<Replication Object>.<Primary Site ID>.sql.<*Replicate Site ID*>

Action - Replication command to run on a particular object (i.e. drop, alter, check, etc.)
SUBSYS - The CSCI Subsystem being replicated.

Replication Object - The type of replication object being acted upon. (i.e. Subscription, replication definition, etc.)

Primary Site ID - The site ID identified as the Primary site for this particular subsystem's data. This field is named "PRIME" for the template scripts and is changed via a Unix install script during installation and configuration activities at the site.

sql - convention for identifying that this script is an SQL (Replication) script.

Replicate Site ID - This field does not apply to every script convention. This field is defined on scripts that act upon replication subscription objects. The "REP" field name for the template script is changed during installation and configuration at the site. This suffix identifies the replicate site to which the data will be replicated.

7.2 Replication Definitions

Replication definitions that have been defined against MSS tables and columns are detailed herein.

create.mss.repdefs.sql.PRIME

```
create replication definition MsAcUsrProfile_repdef_SMC(RV_ID)
    with primary at <pDs>.<pDb>
    with all tables named 'MsAcUsrProfile'
        (userId varchar(14),
         homeDAAC varchar(3),
         title varchar(5),
         firstName varchar(20),
         middleInit varchar(1),
         lastName varchar(20),
         motherMaidenName varchar(20),
         ECSAuthenticator varchar(32),
         GTWYUsrType varchar(20),
         eMailAddr varchar(255),
         internetAffiliation varchar(14),
         organization varchar(60),
         projectName varchar(30),
         affiliation varchar(16),
         researchField varchar(64),
         privilegeLevel varchar(10),
         creationDate datetime,
         expirationDate datetime,
         mailAddrStreet1 varchar(32),
         mailAddrStreet2 varchar(32),
         mailAddrStreet3 varchar(32),
         mailAddrCity varchar(35),
         mailAddrState varchar(20),
         mailAddrZip varchar(15),
         mailAddrCountry varchar(30),
         mailAddrPhone varchar(22),
         mailAddrFax varchar(22),
         billAddrStreet1 varchar(32),
         billAddrStreet2 varchar(32),
         billAddrStreet3 varchar(32),
         billAddrCity varchar(35),
         billAddrState varchar(20),
         billAddrZip varchar(15),
         billAddrCountry varchar(30),
         billAddrPhone varchar(22),
         billAddrFax varchar(22),
         billContactName_First varchar(20),
         billContactName_Last varchar(20),
         billContactName_MI char(1),
         billContactOrg varchar(60),
         billContactTitle varchar(5),
         billEMailAddr varchar(255),
```

```

shipAddrStreet1 varchar(32),
shipAddrStreet2 varchar(32),
shipAddrStreet3 varchar(32),
shipAddrCity varchar(35),
shipAddrState varchar(20),
shipAddrZip varchar(15),
shipAddrCountry varchar(30),
shipAddrPhone varchar(22),
shipAddrFax varchar(22),
shipContactName_First varchar(20),
shipContactName_Last varchar(20),
shipContactName_MI char(1),
shipContactOrg varchar(60),
shipContactTitle varchar(5),
shipEMailAddr varchar(255),
asterCategory numeric,
darExpeditedData bit,
nasaUser varchar(1)
category varchar(7),
accessPrivilege varchar(8))
primary key ( userId )
searchable columns (homeDAAC)
replicate all columns
go

```

7.3 Replication Subscriptions

Replication subscriptions that have been defined against MSS tables and columns are detailed herein.

```
define.mss.subs.PRIME.sql.REP
```

```
/* ===== */
/* DAAC Table : MsAcUsrProfile */
/* ===== */
```

```
Create subscription MsAcUsrProfile_sub_SMC_<DAAC>_<RV_ID>
for _MsAcUsrProfile_redef_SMC_<RV_ID>
with replicate at <rDs>.<rDb>
go
```

7.4 Replication Database Configuration

Replication Database Configuration specifications applicable to MSS replication are contained herein.

MSS - Uses the following parameters:

dsi_keep_triggers (This parameter enables or disables the ability for replicated transactions to execute triggers at the replicated database. (Off for MSS)
dsi_replication (This parameter enables or disables the

ability to replicate transactions executed by the maintenance user.
(Off for MSS)

7.5 Replication Server Configuration

Replication Server Configuration specifications applicable to MSS replication are contained herein.

Configure the enable RepAgent threads to 1. This enables the RepAgent thread Integration in the Adaptive server.

Appendix A. MSS ERDs

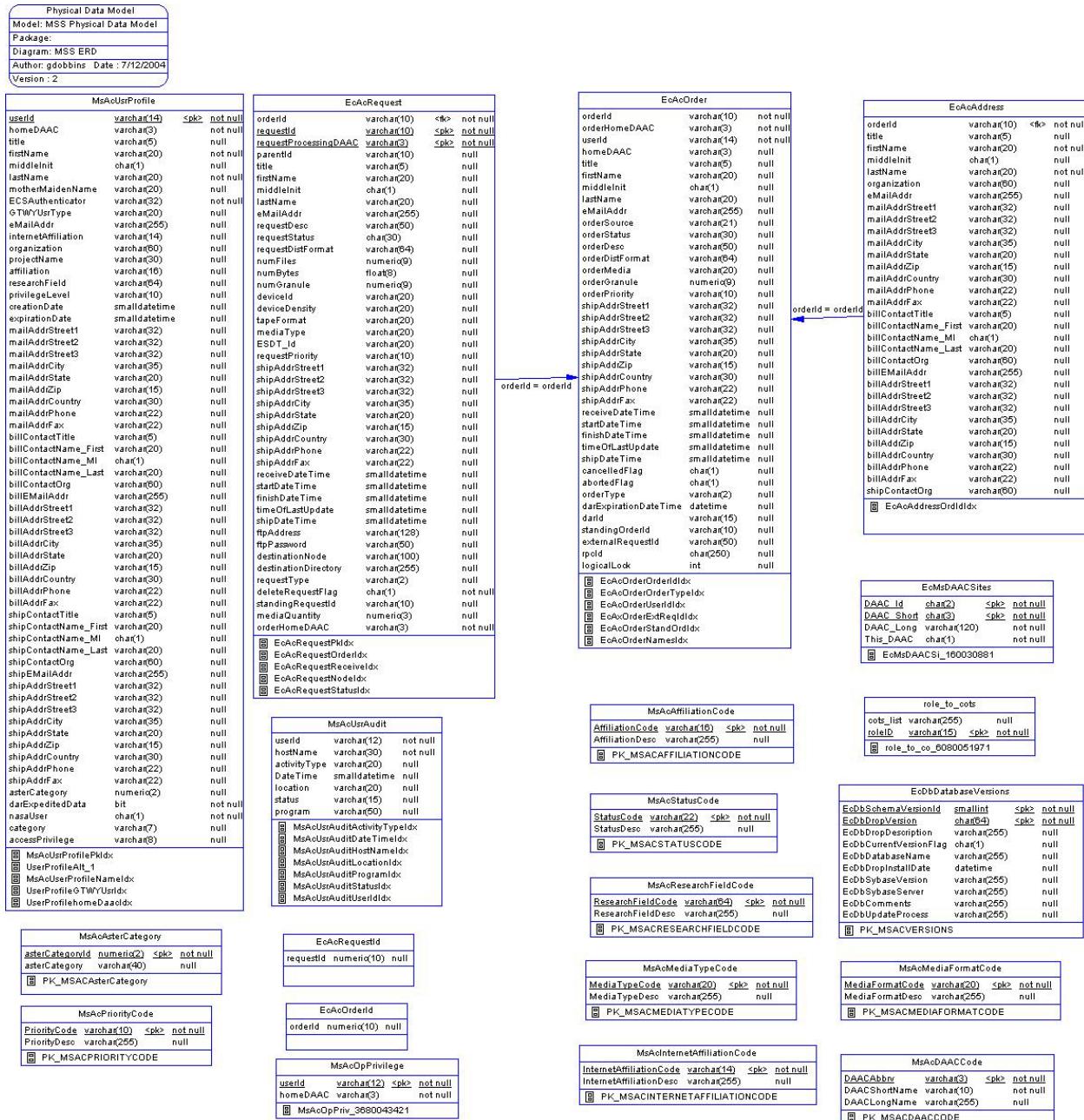


Figure A-1. Systems Management Subsystem

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Abbreviations and Acronyms

CASE	Computer Aided Software Engineering
CDRL	Contract Data Requirements List
CONFIG	Configuration Registry Subsystem
DBMS	Database Management System
DCN	Document Change Notice
DD&M	Data Development and Management
DID	Data Item Description
DM	Data Management
EDHS	ECS Data Handling System
EOS	Earth Observing System
EOSDIS	EOS Data and Information System
ERD	Entity Relationship Diagram
FK	Foreign Key
I/O	Input/Output
MSS	Management Support Subsystem Management Subsystem
PDF	Portable Document Format
PDPS	Planning and Data processing Subsystem
PK	Primary Key
SDSRV	Science Data Server
SSS	Spatial Subscription Server
STMGT	Storage Management
SUBSRV	Subscription Server
URL	Universal Resource Locator
WWW	World-Wide Web

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